



Project Abstract

Agents of Change, Collaborative Research “The Dynamics of Civil War Outcomes: Bosnia and the North Caucasus”

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Overall Mission

This research explores the situation produced by civil wars in Bosnia and in the North Caucasus area of Russia. Both regions experienced violent civil war in the 1990s as a result of the break-up of Yugoslavia and the Soviet Union. When major fighting ended in Bosnia in 1995, the country was divided by the Dayton Peace Accords into two federations and remains under the protection of international military forces, and ethnic cleansing is supposed to be reversed by guarantees of return migration. The civil war continues at a lower scale in the North Caucasian republic of Chechnya with continued displacement of hundreds of thousands of refugees in adjoining republics and frequent terrorist acts across the Chechen border.

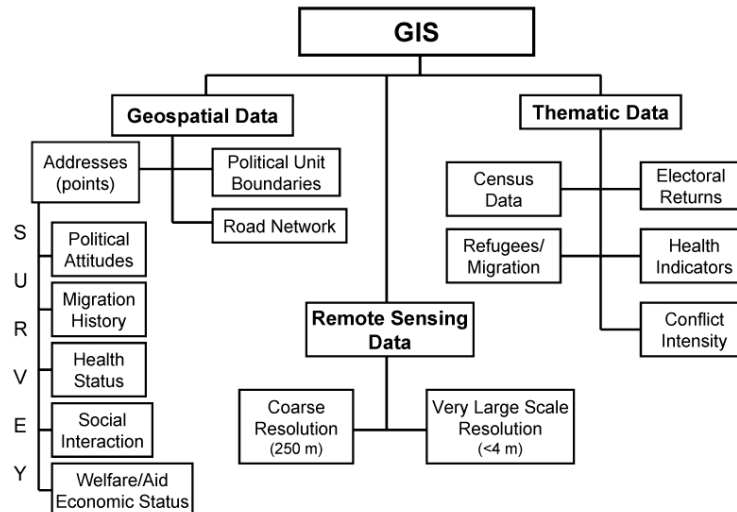
Four inter-related questions lie at the heart of the study:

- 1) What is the character and localized distribution of economic, social, political, environmental and health outcomes of the wars in the two conflict zones?
- 2) What factors explain these distributions?
- 3) How can the application of an integrated methodology of individual and aggregate data that relies on opinion survey, census, governmental, and remote sensing data collection be operationalized in a spatial analysis across a variety of scales?
- 4) Are postwar developments in the former conflict regions promoting or retarding interethnic harmony and democratic values, thus enhancing or reducing the prospects for long-term peace?

Progress and Preliminary Outcomes:



The project builds a Geographic Information System for each study region that integrates three types of data (satellite imagery, census and other aggregate data, and survey data) at multiple scales as is indicated in the figure below.



a) Remote sensing data collection and preliminary analysis: Our initial work has collected a variety of satellite imagery at different scales for both landuse/landcover change classification and identification of possible shifts in agricultural activity from pre to postwar periods. The University of Maryland's Global Land Cover Classifications (GLCC) dataset was used to calculate percent forest and percent cropland for the 109 Bosnian *opstine* (counties). The data are available at multiple resolutions, but the most detailed 1km data were used in our study. These data are derived from NASA's AVHRR sensor and based on the computed NDVI (Normalized Difference Vegetation Index) values. To simplify the forest categories, evergreen, deciduous, and mixed forest types were spatially aggregated into a single forest category. Percent forest and cropland were then calculated for each *opstina*.

A more detailed land cover dataset was also used from the Food and Agriculture Organization of the UN, Sarajevo office. This dataset was derived using visual interpretation from Landsat 7 satellite data at 30m resolution. Since the Landsat data were captured after the conflict, they provide data for abandoned agricultural land related to war activity. *Opstina*-scale variables were derived from this land cover classification by combining the categories abandoned and predominantly abandoned land, forest and predominantly forest land, and arable and predominantly arable land. Examples of the resultant distributions are shown in Figure 1.



Bosnia Land Use

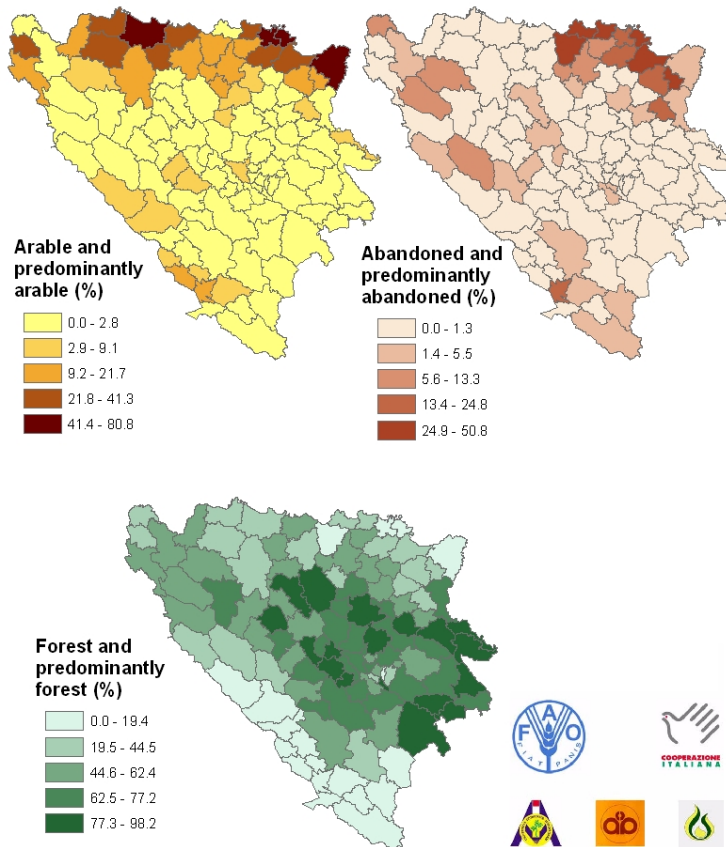


Figure 1: Land use categorization of Bosnian opstine in 1998 using FAO remote sensing data.

A similar remote sensing analysis is currently underway in the North Caucasus with a view to identifying pre- and postwar land uses and to making a choice of more detailed satellite imagery for the rayoni (counties) that are the sites of the opinion surveys of individuals and communities affected by the wars. This detailed imagery (scenes of pre-war, during the war and post war) will allow us to document microscale changes in agricultural and other economic trends at a scale of less than 30 meters.

b) Census and other aggregate data: The last population census in Bosnia was conducted in 1991 before the wars marking the breakup of Yugoslavia began. In Russia, a recent census in October 2002 has been slow to release data but the investigators have now acquired the key nationality and demographic data for the counties of the North Caucasus study region. As well as census data, data collected by other national and international agencies have been instrumental in helping to define the scope of the study and the key places for indepth analysis of the effects of the wars. Among these data are refugee data, data on elections, data on mines and other war materiel and damage, data on economic change and data on infrastructure. These data have been



integrated into the respective GIS for Bosnia and the North Caucasus. Some examples of these maps are shown in Figures 2 -6.

Bosnia Refugee Returns 2003

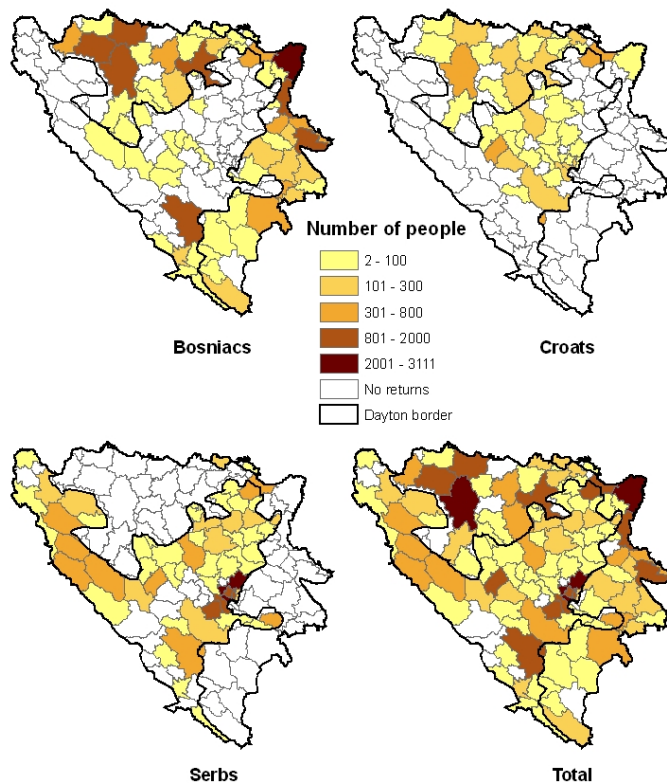


Figure 2: The distribution of refugee returns by ethnicity in Bosnia in 2003 according to *opstina*.

Data on refugee returns are collected monthly by international agencies and can be aggregated across all years. These data seem to show a high degree of success in reversing ethnic cleansing since the war produced over 2 million refugees, many of whom were “cleansed” from areas in which their group was a minority. This was particularly the case in parts of (what became) the Serb republic. While many of the refugees have claimed their property, the actual ratio of those who live in the reclaimed homes is much lower, as the PI and co-PI O Tuathail have seen in their Bosnian field work in June 2005. Many of the properties in the regions most affected by the war (NE Bosnia) for example are still abandoned, destroyed or in the process of being reconstructed. The photographs below, taken in the Zvornik area of the Serb Republic along the border with Serbia, indicate the nature of the current situation. Mosques and churches are being rebuilt, monuments are in effect reclaiming ethnic spaces, and housing is being reconstructed next to abandoned and pillaged buildings that date from the period of ethnic cleansing in 1992. While



some mass graves have been excavated, others remain undiscovered. Typical examples are shown in Figure 3,a-e below.



a)

b)

c)



d)

e)

f)

- a) New war memorial to Serb dead in the Ekonomija settlement, Zvornik
- b) Reconstructed Serb Orthodox church, Srebrenica
- c) Recently completed mosque in the Serb republic of Eastern Bosnia
- d) The Crni Vrh mass grave (June 2005) where 1500 victims of the Srebrenica massacre were buried
- e) Rebuilding a war damaged house in Eastern Bosnia
- f) Looted Muslim property as evidence of ethnic cleansing Bratunac, eastern Bosnia

Bosnia agricultural and other land uses are still severely hindered by the presence of mines. The location of the war's frontlines (and the inter-ethnic boundary line today) can be easily determined by their concentration.

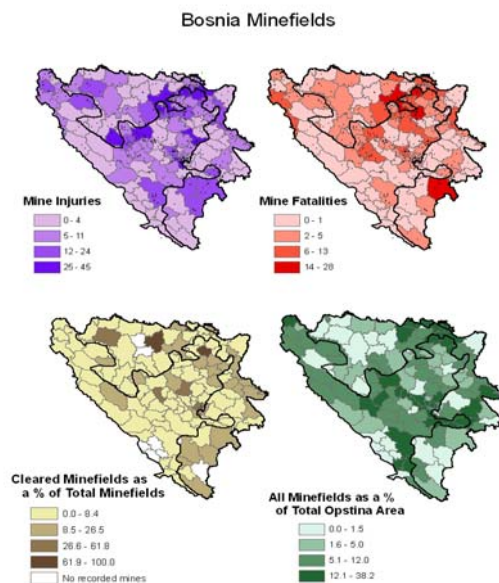


Figure 4: Landmines (including clearances) in Bosnia as % of opstina and cause of injury and death.

We are conducting a similar data collection and analysis of secondary (archival) material in the North Caucasus and will be engaging in fieldwork there in September-October 2005.

Opinion and Attitude Survey:

One of the major foci of the collection of secondary data is to use this information to classify the territorial subunits of the study area for purposes of selecting typical representations of the types of communities present in both regions. Our surveying strategy is to stratify the approximately 110 counties in each study site by their aggregate composition (ethnicity, war experiences, refugee impact, economic change etc) and to select about 35 units for administration of the survey. We will collect opinion and attitude data from 2000 adults in both regions in surveys to be administered in early Fall 2005.

In Bosnia, for example, we used a clustering procedure to allocate the 109 opstina to 7 groups using the various aggregate data as inputs to the procedure. The resulting map (figure 5) shows some geographic clustering but the main emphasis is not on spatial contiguity but on opstina similarity.

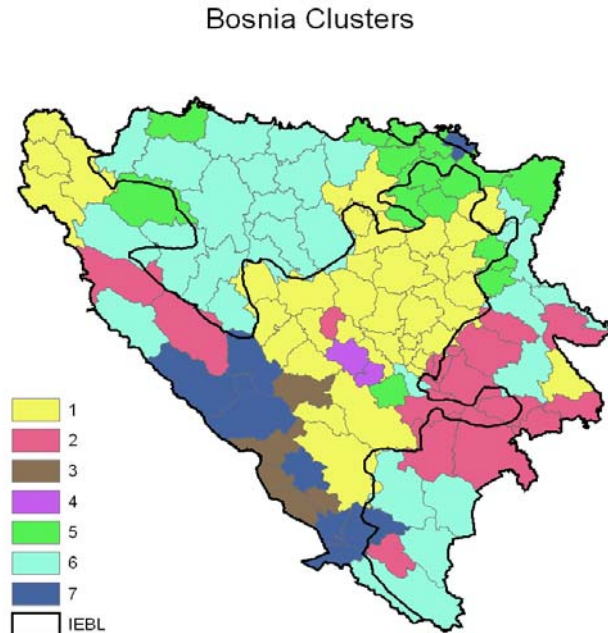


Figure 5: Clustering of the opstine of Bosnia into 7 groups using 25 input aggregate measures.

One of our aims is to conduct multilevel modeling in which we hypothesize that the attitudes, opinions and behavior of residents of war zones are not only conditioned by the usual socio-economic predictors (age, ethnicity, education, gender etc) but also by the nature of the community in which they live. Thus, as might be expected from a joint geography-political science investigative team, we want to check to see if the more general relationships between predictors and outcomes are also affected by the type of environment in which the respondent lives. To do this, we need to gather enough samples in each community to allow the use of the multi-level modeling procedure – we will have at least 100 surveys for each community and the sampling strategy allows proportional response rates according to the size and ethnic composition of the communities.

In Bosnia, for example, we have selected 35 places for the survey which will be conducted according to the random route method (the same procedure is being used in the North Caucasus).

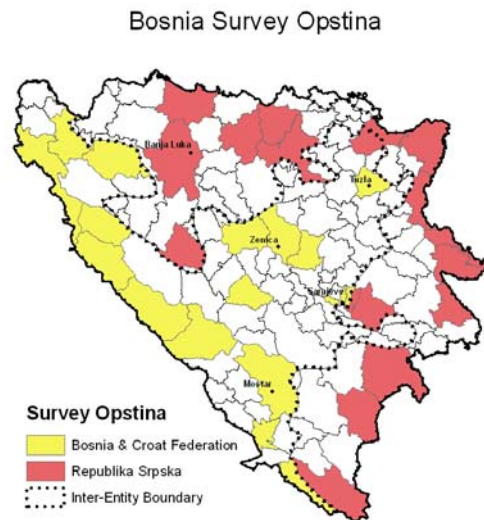


Figure 6: The selection of opstina for opinion surveys in Bosnia-Herzegovina

The survey that we have developed has 75 questions divided into about 15-20 socio-demographic (or predictor) questions and the rest of the questions probe attitudes to own and other ethnic groups, war and after-war experiences, migration history, interaction with members of different groups, and personal status, including physical and mental health status. A notable feature of the survey is the use of “vignettes” that tell a short story and ask the respondent to interpret it. Results from the vignettes allow the adjustment of survey responses across different cultures, in this case, to make the responses of the two samples comparable. About 20 questions of the 75 will be specific to the situation in each study site and the rest are the same. The survey has been translated into the respective languages and contracts have been signed with the respective survey firms to carry it out. Preliminary results will be available by the end of October 2005.

In our statistical analysis, we will match the survey responses to the aggregate data and to the high-resolution remote sensing data that will be purchased in Fall 2005. The main statistical methods will be social network analysis and multi-level modeling.

Broader Impacts:

The research deepens the empirical analysis of underlying factors of possible future conflict in the Islamic republics of the North Caucasus of Russia and in Bosnia. It also gauges the prospects for peaceful relations between nationalities in the two regions and provides answers to key questions about the nature of community conditions in former war zones as local, national and international agencies try to cope with the aggregated disruptions to peoples, economies and environments over the past 15 years. The PIs, a collaborative team representing five US



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universities and local research partners in Russia and Bosnia, ascertain the scope of structural and personal damages, the separate and cumulative effects of forced and voluntary population movement, the differential impacts across localities and communities of war dynamics and the depth of national, religious or ethnic-based consciousness.